

WHAT IS CLAIMED IS:

1. An apparatus for controlling the position of a screen pointer for an electronic device having a display screen, the apparatus comprising:
  - a light source for illuminating an imaging surface, thereby generating reflected images;
  - a single chip for receiving the reflected images, generating digital representations of the reflected images, generating a first set of movement data based on the digital representations of the reflected images, the first set of movement data indicative of relative motion between the chip and the imaging surface, the single chip including a serial interface for outputting motion data in a serial format based on the movement data.
2. The apparatus of claim 1, wherein the apparatus is an optical mouse.
3. The apparatus of claim 1, wherein the serial interface is a Universal Serial Bus (USB) interface.
4. The apparatus of claim 1, wherein the single chip is configured to receive button press information identifying a button that has been pressed on the apparatus.
5. The apparatus of claim 4, wherein the single chip is configured to output the button press information in a serial format through the serial interface.
6. The apparatus of claim 1, wherein the single chip is configured to receive Z wheel information indicative of movement of a Z wheel on the apparatus.
7. The apparatus of claim 6, wherein the single chip is configured to output the Z wheel information in a serial format through the serial interface.

8. The apparatus of claim 1, wherein the serial interface is configured to be coupled to a host device, and wherein the single chip is configured to provide testing information about the chip to the host device through the serial interface.

9. The apparatus of claim 1, wherein the single chip is configured to receive orientation information indicating a mounting orientation of the single chip.

10. A method of controlling the position of a screen pointer for an electronic device having a display screen, the method comprising:

illuminating an imaging surface, thereby generating reflected images;

directing the reflected images onto an electronic chip, the electronic chip including an array of photo detectors;

digitizing output values of the photo detectors with the electronic chip, thereby generating digital representations of the reflected images;

correlating at least one version of a first one of the digital representations with at least one version of a second one of the digital representations using circuitry on the electronic chip;

generating with the electronic chip a first set of motion data based on the correlation, the first set of motion data indicative of relative motion in orthogonal axes between the electronic chip and the imaging surface;

outputting movement data in a serial format from the electronic chip based on the generated motion data; and

adjusting the position of the screen pointer in accordance with the movement data.

11. The method of claim 10, wherein the electronic chip is incorporated in an optical mouse.

12. The method of claim 10, wherein the serial format is a Universal Serial Bus (USB) format.

13. The method of claim 10, and further comprising:  
receiving button press information with the electronic chip, the button press information identifying a button coupled to the electronic chip that has been pressed; and  
outputting the button press information from the electronic chip in a serial format.
14. The method of claim 10, and further comprising:  
receiving Z wheel information with the electronic chip, the Z wheel information indicative of movement of a Z wheel coupled to the electronic chip;  
and  
outputting the Z wheel information from the electronic chip in a serial format.
15. The method of claim 10, and further comprising:  
outputting test information from the electronic chip in a serial format, the test information including results of internal tests performed by the electronic chip.
16. An electronic chip for use in an apparatus for controlling the position of a screen pointer, the electronic chip comprising:  
an array of photo detectors for receiving reflected light from an imaging surface;  
an analog to digital converter coupled to the array of photo detectors for generating digital image data based on outputs of the photo detectors;  
a controller coupled to the analog to digital converter, the controller configured to generate a first set of movement data based on the digital image data, the first set of movement data indicative of relative motion between the electronic chip and the imaging surface; and  
a serial interface coupled to the controller for outputting motion data based on the generated movement data in a serial format.

17. The electronic chip of claim 16, wherein the apparatus is an optical mouse.
18. The electronic chip of claim 16, wherein the serial interface is a Universal Serial Bus (USB) interface.
19. The electronic chip of claim 16, wherein the electronic chip is configured to receive button press information identifying a button that has been pressed on the apparatus, and wherein the electronic chip is configured to output the button press information in a serial format through the serial interface.
20. The electronic chip of claim 16, wherein the electronic chip is configured to receive Z wheel information indicative of movement of a Z wheel on the apparatus, and wherein the electronic chip is configured to output the Z wheel information in a serial format through the serial interface.
21. The electronic chip of claim 16, wherein the controller is a pico-processor.
22. The electronic chip of claim 16, wherein the first set of movement data generated by the controller is also based on orientation information indicating a mounting orientation of the electronic chip within the apparatus.